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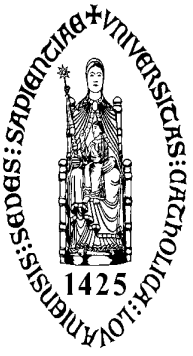

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Market Power, Competition and Ownership in Emerging Economies*

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Abstract

In this paper, we analyze the effects of trade, concentration and ownership on the pricing behavior of firms in two transition countries, Bulgaria and Romania. We use an extensive dataset of more than 3000 firms and sector level information to estimate the effect of these three factors on the price cost margin (PCM) for the period 1994-1998. We find: 1) that trade disciplines the industry in concentrated industries; 2) that high concentration is associated with more market power; 3) that private and foreign owned firms have higher PCMs. This indicates that the pricing strategy of private firms is inherently different than the one of state firms, either as the result of different objectives or induced by the abuse of market power.

Keywords: market power, price cost margin, trade, competition, ownership, transition

JEL Codes: L1, L33, P3

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1 Introduction

One of the key features that characterized the emerging economies of Central and Eastern Europe at the start of the transition process was the highly distorted firm size distribution, heavily biased towards the larger firm sizes (for evidence see Roland, 2000). This legacy from communism suggests that many sectors and regions were potentially characterized by relatively high monopoly power. The mass privatization process and the liberalization of markets, however, did not necessarily imply the emergence of competitive markets, especially if effective competition policy authorities were slow to emerge (Dutz and Vagliasindi, 2000; EBRD, 1999). This paper is the first to assess the importance of market power in two slowly reforming countries of Central and East Europe, namely Bulgaria and Romania. To this end, we use a unique panel of data, including more than 3,000 manufacturing firms in the 90s to estimate market power of firms and how this may have been affected by the emergence of private ownership and competitive pressure.

Figures 1 and 2 show the evolution of the concentration index[1] and import penetration in Bulgaria and Romania since 1993. It is clear that product market concentration is declining relatively fast and import penetration is going up in both countries, which suggests that increased competition is in fact taking place[2].

<Insert Figures 1 and 2 around here>

A number of papers have looked at the relationship between competitive pressure and firm performance in transition economies (see e.g. Earle and Estrin, 1996, Konings, 1997; Brown and Earle, 2000, Carlin et al., 2001, Grosfeld and Tressel, 2001, Estrin et al., 2001). The main focus of these papers was on the effects of competitive pressure on production efficiency and restructuring.

However, apart from having an impact on firm efficiency, increased competitive pressure is likely to affect the pricing behavior of firms and hence

[1] For Bulgaria we report the Herfindahl index of concentration; for Romania we report the C5 concentration index and, from 1996 onwards, the Herfindahl index since it is not available for earlier periods.

[2] Fingleton et al. (1996) document and discuss the evolution of product market competition in transition countries and the mergence of competition policy in Central and Eastern Europe.

their market power. In particular, there are two main concerns in the context of transition countries. First, the heavily concentrated market structure inherited from the communist period might imply an abuse of market power if firms are simply transferred to the private sector without prior demonopolization: horizontal collusion and vertical foreclosure will probably hamper allocative efficiency (Tirole, 1991). Second, while we can observe on average a decline in concentration ratios suggesting increased competitive pressure, it is not clear whether this is associated with a decline in market power on average at least in the short run. Thus, the key question which needs to be addressed is whether 'competition works' or not in the emerging economies of Central and Eastern Europe.

A few papers have previously studied the effect of increased competitive pressure on the price-cost margins or market power of firms in transition or developing countries. Hersch, Kemme and Bhandari (1993) estimate a standard model of the determinants of price-cost margins using a small data set constructed from firm level surveys. However, they do not find very strong evidence that an increased number of firms has some disciplining effect on price-cost margins. Dobrinsky et al (2001) and Halpern and Korosi (2001) reported estimates of price-cost margins for Bulgaria and Hungary respectively, providing evidence of non-competitive pricing in many industries. Levinsohn (1993) investigates the effects of trade policy in Turkey between 1983 and 1986, where a major "switch of regime" occurred in December 1983 (the government decided significant import liberalization measures after a first wave favoring exports in 1980). He finds that markups decreased in previously non competitive sectors where trade was liberalized and increased in sectors where trade restrictions were imposed. Harrison (1994) estimates the effect of trade liberalization on market power and productivity using a sample of 246 Ivorian firms during the period 1979-1987. She finds weak evidence that trade liberalization led to a decline in market power and an increase in productivity. Krishna and Mitra (1998) follow a similar approach: they test the effect of the 1991 trade liberalization in India using a sample of 363 firms and find some evidence of a decrease in market power and an increase in productivity.

We make various contributions to the literature. In this paper we estimate price-cost margins using a method proposed by Roeger (1995) which allows us to use the nominal value of data on sales and input factors, without having to deflate them with a price deflator. This is important because in an emerging economy it is not always clear what the appropriate price

deflator should be, given that prices were only recently liberalized and that prices themselves are outcomes of firm behavior. Moreover, the estimations are based on a large representative data set of virtually the entire population of firms in the manufacturing sector in Romania and Bulgaria. Second, we are able to make a distinction between privatized, foreign and state owned firms. In the context of transition economies it has been argued that demonopolization prior to privatization is important if one is to achieve allocative efficiency (Tirole, 1991; Hoekman and Djankov, 1997). We are able to assess whether privatization was associated with increased market power or not. Furthermore, we have information on whether the firm is foreign owned. This allows us to assess whether foreign direct investment is associated with market power. The literature of multinational enterprises (MNEs) suggests that MNEs are often characterized by scale economies and the presence of market power (e.g. Markusen, 1995). There has also been a policy concern associated with foreign direct investment in the emerging economies. The former EU Commissioner for competition policy, Karel Van Miert, has argued that foreign firms have concentrated their investments in sectors with market power with the support of Central and East European governments[3].

The structure of this paper is as follows. The next section describes the econometric approach that we follow and the data set. Section 3 gives the results, while section 4 concludes the paper.

2 Background and Econometric Model

2.1 The model

Our methodology is based on Hall (1986), Domowitz et al. (1988) and Roeger (1995). We start from a standard production function $Q_{it} = \Theta_{it} F(N_{it}, K_{it}, M_{it})$ where i is a firm index, t a time index, Θ_{it} is a parame-

[3] "*Experience shows that while it is true that liberalisation of prices, trade and foreign direct investment are essential to create workable markets and competition among firms, they are not sufficient to ensure effective competition. Trade liberalisation has proved to be and, in certain cases, still is a difficult objective to be achieved. Moreover, foreign firms have focused their investments in the CEECs on few firms in certain sectors with considerable market power and governments have been willing to grant these foreign investors protections from competition. Furthermore, many markets are still local and national markets are often segmented from world markets due to natural, economic and regulatory barriers to entry*", quote from *Competition Policy Newsletter*, June 1998

ter capturing technical progress, N is labor, K is capital and M is material input.

Under perfect competition, it is well known since Solow that the growth rate of output can be decomposed as follows:

$$\frac{\Delta Q_{it}}{Q_{it}} = \alpha_{Nit}\frac{\Delta N_{it}}{N_{it}} + \alpha_{Kit}\frac{\Delta K_{it}}{K_{it}} + \alpha_{Mit}\frac{\Delta M_{it}}{M_{it}} + \vartheta_{it} \tag{1}$$

where $\alpha_{Jit} = \frac{P_{Jit}J_{it}}{P_{it}Q_{it}}$ $(J = N, K, M)$ is the share of inputs in turnover and $\vartheta_{it} = \frac{\Delta\Theta_{it}}{\Theta_{it}}$.

Under imperfect competition, Eq. (1) becomes (Hall, 1986):

$$\frac{\Delta Q_{it}}{Q_{it}} = \mu_{it}\left(\alpha_{Nit}\frac{\Delta N_{it}}{N_{it}} + \alpha_{Kit}\frac{\Delta K_{it}}{K_{it}} + \alpha_{Mit}\frac{\Delta M_{it}}{M_{it}}\right) + \vartheta_{it} \tag{2}$$

where $\mu = \frac{p}{c}$ is the markup of price over marginal cost.

Assuming constant returns to scale, another way to write Eq. (2) is:

$$\begin{aligned} & \frac{\Delta Q_{it}}{Q_{it}} - \alpha_{Nit}\frac{\Delta N_{it}}{N_{it}} - \alpha_{Mit}\frac{\Delta M_{it}}{M_{it}} - (1 - \alpha_{Nit} - \alpha_{Mit})\frac{\Delta K_{it}}{K_{it}} \qquad (3) \\ = \;& \beta_{it}\left(\frac{\Delta Q_{it}}{Q_{it}} - \frac{\Delta K_{it}}{K_{it}}\right) + (1 - \beta_{it})\,\vartheta_{it} \end{aligned}$$

where $\beta = \frac{p-c}{p} = 1 - \frac{1}{\mu}$ is the price cost margin or Lerner index.

It is also possible to derive a similar expression for the price based, or dual, Solow residual (Roeger, 1995):

$$\begin{aligned} & \alpha_{Nit}\frac{\Delta P_{Nit}}{P_{Nit}} + \alpha_{Mit}\frac{\Delta P_{Mit}}{P_{Mit}} + (1 - \alpha_{Nit} - \alpha_{Mit})\frac{\Delta P_{Kit}}{P_{Kit}} - \frac{\Delta P_{it}}{P_{it}} \qquad (4) \\ = \;& -\beta_{it}\left(\frac{\Delta P_{it}}{P_{it}} - \frac{\Delta P_{Kit}}{P_{Kit}}\right) + (1 - \beta_{it})\,\vartheta_{it} \end{aligned}$$

where P_{Kit} is the user cost of capital, defined as:

$$P_{Kit} = P_{It}\frac{r_{it} + \delta_{it}}{1 - t_{it}}$$

Most of the variables used to compute the user cost of capital are at the firm level: δ_{it} is the depreciation rate, r_{it} is the real interest rate and t_{it} is corporate taxation. Only P_I, the index of investment goods prices, is at the country level.

Then substracting (4) from (3) we get:

$$\begin{aligned} & \left(\frac{\Delta Q_{it}}{Q_{it}} + \frac{\Delta P_{it}}{P_{it}}\right) - \alpha_{Nit}\left(\frac{\Delta N_{it}}{N_{it}} + \frac{\Delta P_{Nit}}{P_{Nit}}\right) - \alpha_{Mit}\left(\frac{\Delta M_{it}}{M_{it}} + \frac{\Delta P_{Mit}}{P_{Mit}}\right) \\ & - (1 - \alpha_{Nit} - \alpha_{Mit})\left(\frac{\Delta K_{it}}{K_{it}} + \frac{\Delta P_{Kit}}{P_{Kit}}\right) \\ = \; & \beta_{it}\left[\left(\frac{\Delta Q_{it}}{Q_{it}} + \frac{\Delta P_{it}}{P_{it}}\right) - \left(\frac{\Delta K_{it}}{K_{it}} + \frac{\Delta P_{Kit}}{P_{Kit}}\right)\right] \end{aligned} \tag{5}$$

Rewriting the left hand side as Δy and the right hand side as Δx, one obtains a very simple testable equation: $\Delta y_{it} = \beta_t \Delta x_{it} + u_{it}$. We shall use Eq. (5) to estimate the *average* price cost margin as an indicator of market power[4]. To assess the effect of trade, concentration and ownership, we interact Δx with sector level data on concentration, import shares, and firm level information about ownership.

2.2 Hypotheses

First, concentration could lead to more market power and hence should have a positive effect on price cost margins (Domowitz et al., 1988). Indeed, most oligopoly models would yield a negative relationship between the PCM and the number of firms operating on a given market (see e.g. the $P(N)$ function, Sutton, 1991) for a given toughness of competition parameter. Contrary to what is believed to be the case in developed economies, market structure

[4] Assuming constant returns to scale in transition countries using firm level data might be a wrong assumption. It is however quite easy to generalise the methodology and allow for variable returns to scale. Under increasing returns to scale,

$$\frac{WN}{cQ}\frac{\Delta N}{N} + \frac{P_M M}{cQ}\frac{\Delta M}{M} + \frac{rK}{cQ}\frac{\Delta K}{K} = 1 + \gamma$$

where $\gamma \geq 0$

and our final equation can then be written as:

$$\Delta y_{it} = \beta_t \Delta x_{it} + \gamma'\left(\frac{\Delta K_{it}}{K_{it}} + \frac{\Delta P_{Kit}}{P_{Kit}}\right) + u_{it}$$

where $\gamma' = \frac{\gamma}{\mu}$

in transition economies is largely exogenous and a legacy of the past planned economy. We therefore expect β_2 to be negative in Eq. (6).

$$\Delta y_{it} = \beta_1 \Delta x_{it} + \beta_2 HERF_{jt} * \Delta x_{it} + \gamma_2 HERF_{jt} + u_{it} \tag{6}$$

where $HERF_{jt}$ is the 3-digit NACE Rev.1 Herfindahl index in industry j in year t.

Second, trade should discipline the industry and lead to lower PCMs, and we expect β_4 to be negative:

$$\Delta y_{it} = \beta_3 \Delta x_{it} + \beta_4 IMP_{jt} * \Delta x_{it} + \gamma_4 IMP_{jt} + u_{it} \tag{7}$$

where IMP_{jt} is the 3-digit NACE Rev.1 share of imports in domestic consumption in industry j in year t.

As reported in Tybout (2001), this effect is generated by a variety of models. Yet empirical papers are relatively scarce, with the exception of Levinsohn (1993) and Harrison (1994).

Third, privatization to domestic or foreign owners should lead to higher price cost margins ($\beta_6 > 0$ and $\beta_7 > 0$) if industries were not demonopolized before the firms were privatized (Tirole, 1991), relative to the default category, state ownership. Another explanation of an ownership effect on price cost margins could be that private owners follow a different (more profit oriented) pricing strategy, as is often assumed in public economics (Vickers and Yarrow, 1988; Bös, 1991). These explanations are complementary as profit maximization by private firms takes place in the context of a given market structure, which itself can be shaped by government policy to a certain extent.

New trade theories incorporating aspects of foreign direct investment recognize that "*industries characterized by scale economies and imperfect competition are often dominated by multinationals*" (Markusen, 1995, p.169). As new investment opportunities become available, multinationals are likely to target firms with potentially considerable market power, sometimes with the support of governments which want to attract them (see the quote in footnote 3).

We test whether foreign ownership and domestic private ownership is associated with higher PCMs ($\beta_6 > 0$ and $\beta_7 > 0$):

$$\begin{aligned}\Delta y_{it} &= \beta_5 \Delta x_{it} + \beta_6 FOREIGN_{it} * \Delta x_{it} + \beta_7 DOMPRIV_{it} * \Delta x_{it} \\ &\quad + \gamma_6 FOREIGN_{it} + \gamma_7 DOMPRIV_{it} + + u_{it}\end{aligned} \quad (8)$$

where $FOREIGN_{it}$ is a dummy variable equal to 1 if the shares of firm i in year t are held in majority by foreign investors, and equal to 0 otherwise. Similarly, $DOMPRIV_{it}$ is a dummy variable equal to 1 if the shares of firm i in year t are held in majority by private domestic investors, and equal to 0 otherwise.

3 Data

We have a unique data set of 2047 Romanian firms and 1701 Bulgarian firms that operate in the manufacturing sector. To be included in the data set at least one of the following three criteria had to be satisfied: number of employees higher than 100, total assets higher than 8 million USD and sales higher than 16 million USD. All the variables are taken from published annual company accounts which were made consistent across countries by "Bureau Van Dyck". The data set is a commercial database and is referred to as the Amadeus data set.

The data cover the period 1994-98, however, we will mainly focus the analysis on the period 1997-98 because it is only for these two years that we have detailed information on the ownership structure of firms. In the appendix, tables B1 and B2 compare the employment and sales coverage of the data with the total employment and sales in manufacturing reported in the statistical yearbooks. We can note that our data cover most of the employment and sales in manufacturing in both countries. In table B2 we can also see that the data are quite representative at the 2 digit NACE sector level. So we are using a representative firm level data set for Bulgarian and Romanian manufacturing firms.

Table 1 shows the summary statistics of most of the variables that we use in our analysis. The data appendix describes the definitions and measurement issues of the various variables that we employ. We see that Romanian firms are on average larger than their Bulgarian counterparts both in terms of employment and revenues.

<Insert Table 1 around here>

One strength of our data set is that we have detailed information on the ownership structure of firms. In particular, we know the fraction of shares in the firm that is owned by the state, by the private domestic investors and by foreigners. Table 2 illustrates how ownership is distributed on average. State ownership is relatively important in both countries but declined very much in 1998 in Bulgaria, as a major program of privatization finally took place (EBRD, 1999). Foreign ownership is twice more important in Romania than in Bulgaria.

<Insert Table 2 around here>

Based on this detailed description of the shareholding structure and in accordance with the literature on the effect of ownership in transition countries, we classify firms as being majority state owned, majority foreign or majority private domestic. Table 3 details the relative importance of our broad ownership types, as it shows the number of firms falling in each category. The rising number of firms in total is largely due to a better coverage in the latest year. In our analysis we use an unbalanced panel. The low average share of foreign ownership in table 2 hides the fact that foreign ownership is concentrated in a few firms (table 3), where foreign investors own most of the time a majority share[5].

<Insert Table 3 around here>

4 Results

We start by estimating the average price cost margin (PCM) for all firms pooled over all years together[6]. The first row in table 4 shows the results for Bulgaria and Romania respectively. We note that the average

[5]In Bulgaria, foreign investors owned shares in 73 Bulgarian firms, the average share was 68.4% and 63 were holding more than 50% of the shares in 1997. In 1998, 119 firms had a foreign owner, the average share was 63.5% and 83 firms had a majority holding. In Romania, in 1997, there were 258 firms with foreign owners, with an average share of 68%, and 183 were majority foreign owned. In 1998, the number of firms with foreign ownership increased to 271, the average share remained at 68% and foreign investors had a majority share in 191 of them.

[6]We have also experimented with estimating Eq. (5) for each year separately. The estimates were very similar.

PCM is estimated at 20% in both countries. This estimate is in magnitude surprisingly similar to those estimated for Western countries in Konings, Van Cayseele and Warzynski (2001), using firm level data coming from similar company accounts data. The average mark-ups for Belgian firms was 23% and for Dutch firms it was even 30%. We also estimate PCMs for different 2-digit sectors. Table 4 shows that PCMs vary substantially across different sectors in both countries, which may be the result of different institutional and technological factors.

<Insert Table 4 around here>

We therefore test our main hypotheses in tables 5 and 6. In the first column we test whether competitive pressure would lead to disciplining firm behavior, i.e. whether firms' market power or PCM is reduced. We proxy competitive pressure by import penetration and the Herfindahl index. For Bulgaria we can note that increased import penetration is associated with lower price cost margins but the coefficient is not statistically different from 0. Furthermore, highly concentrated sectors do not appear to be characterized by higher price cost margins on average: the coefficient of $\Delta x * HERF$ is negative but not significant.

<Insert Tables 5 and 6 around here>

In Romania we find a statistically significant effect of import penetration and concentration, however, they have the opposite signs of what we would expect. In Romania, higher import penetration is associated with higher price cost margins. Higher concentration levels are associated with higher price cost margins. This tends to suggest that imports do not play the role of disciplining the industry. We will offer a further explanation of these findings later in the paper.

In the second column we add in the effects of ownership. From now on, the results refer only to the years 1997-1998 for which we have detailed ownership. In both Bulgaria and Romania we find that majority privately owned and majority foreign owned firms have significantly higher price-cost margins compared to majority state owned firms. In Bulgaria, foreign owned firms have an average price cost margin (PCM) of 22%. This compares to a PCM of 16% of private firms and 15% of state owned enterprises. In Romania, the average PCMs are 27%, 20% and 14% respectively. This suggests that

especially foreign firms in Bulgaria have the highest market power, while in Romania both foreign firms and private domestic firms have the highest market power.

This appears to indicate that private ownership is associated with an increase in market power, which may be the consequence of the fact that state owned enterprises were not 'demonopolized' prior to privatization. Alternatively, it may also reflect that state owned enterprises were setting prices closer to marginal costs in order to maximize welfare as can be expected from public enterprises, and that this switch to pricing above marginal cost is in line with profit maximizing behavior of privatized firms.

The key result, however, is to note that privately owned firms have a substantially higher degree of market power compared to state owned enterprises. The fact that private firms have higher price-cost margins than state owned enterprises suggests also that privatization may not be a substitute for increasing competitive pressure. The results rather indicate that market power is increasing for private firms, i.e. a weakening of competitive pressure.

In column 3, we interact import penetration and concentration. The perverse effects of import penetration and concentration that we found in some specifications may be due to the fact that imports have a different impact in highly concentrated industries compared to lowly concentrated ones.

We find that in both Bulgaria and in Romania highly concentrated industries are characterized by higher price-cost margins. The negative interaction effect between import penetration and the Herfindahl index suggests that increased imports have a disciplining effect on the pricing behavior of firms especially in highly concentrated industries. For Bulgarian manufacturing, the critical level of the Herfindahl index above which increased import penetration is disciplining firm behavior is 0.21, for Romania this critical value is given by 0.18.

Thus in sectors which are characterized by low levels of product market concentration we find that higher import penetration is associated with higher PCMs. A potential explanation for this finding could be found by interpreting low levels of product market concentration as indicators of sectors where restructuring of firms took place, which would imply breaking up of firms and demonopolization. Warzynski (2001) provides some evidence for this hypothesis. He finds for Poland that sectors with high concentration levels are associated with less gross job reallocation, compared to sectors with low concentration levels. Gross job reallocation in this case is an indi-

cator of the extent of sectoral restructuring. Because restructuring usually implies that firms also change suppliers it is not unreasonable to claim that those firms that restructured may be able look for cheaper raw materials from foreign markets, which allows them to gain market power in their final product market. In contrast, firms in highly concentrated sectors are firms that did not engage in restructuring and are less likely cost-minimisers and therefore are more likely to rely on traditional suppliers. Import penetration in this category is more likely a reflection of increased international competition in their final product market which therefore erodes their market power. There is, however, no way to formally test this hypothesis with the current data available. We cannot distinguish between imports of raw materials and imports of final product at this stage.

So far we assumed constant returns to scale. While this is a reasonable assumption in macro economic studies, it may not hold at the firm level. We therefore test the robustness of our results by allowing for varying returns to scale in column 4 in tables 5 and 6 (see also footnote 4). Our results do not change qualitatively. The average market power in Bulgaria is still estimated at 14%, and our interactions variables are not affected. Actually the coefficient of our increasing returns to scale variable is not significant. For Romania we find that the average price cost margin is now higher, 22%. This shows that controlling for variable returns to scale is relatively important in Romania. However, the effects of import penetration, concentration and ownership are not changed that much. We still find that foreign owned firms are associated with more market power than private domestic firms and that the latter category is associated with more market power than state owned enterprises (the default category).

5 Conclusion

In this paper we have used firm level data to assess the effect of trade, concentration and ownership on market power in Bulgarian and Romanian manufacturing industries. On the one hand, trade should discipline the industry, while concentration has often been considered as a sign of weak competition. On the other hand, a change of ownership structure has been assumed to improve firm (productive) efficiency while little attention has been brought to the issue of allocative efficiency.

We use a unique firm level data set of Bulgarian and Romania manu-

facturing firms to estimate market power using Roeger's (1995) method of decomposing total factor productivity. We find that the average price cost margin is estimated at 20% both in Bulgaria and Romania, a remarkably similar figure to those found for Western economies. We further find that private and especially foreign ownership is associated with higher price-cost margins. This reflects a difference in the pricing strategy between private and state firms, suggesting that transferring property rights from a public to a private owner might lead to an increase in abuse of market power and to higher price cost margins. Trade seems to play a role to discipline the industry, although not as clearly as it was expected a priori. In particular, increased import penetration has a negative effect on market power especially in highly concentrated industries. Furthermore increased competitive pressure measured as a decrease in the industry's concentration ratios is associated with more pricing behavior closer to marginal costs.

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Table 1: summary statistics

	Bulgaria	Romania
	average	average
N	361 (727))	675 (1321)
OR	5.2 (33.5)	7.4 (32)
TFA	2.3 (10.26)	3.1 (14.3)
CM	3.04 (24.1)	4.7 (24)
CE	0.7 (2.7)	1.2 (3.7)
α_N	0.31 (0.25)	0.28 (0.19)
α_M	0.45 (0.27)	0.50 (0.22)
δ	0.17 (0.23)	0.11 (0.19)
r	0.08 (0.18)	0.50 (0.34)

Note: Employment (N) is expressed in number of employees; operating revenues (OR), tangible fixed assets (TFA), costs of employees (CE) and costs of materials (CM) in millions US$; the share of wages in turnover (α_N) and the share of material costs (α_M) are percentages; standard deviations in parentheses.

Table 2: Average ownership shares (in %)

	Bulgaria		Romania	
Type of firm	1997	1998	1997	1998
Private domestic	62 (0.39)	68 (0.37)	58 (0.35)	58.5 (0.35)
Private foreign	4 (0.17)	5 (0.19)	10.5 (0.27)	10.7 (0.27)
State	34 (0.38)	27 (0.34)	31.5 (0.33)	30.8 (0.33)

Note: standard deviations in parentheses.

Table 3: Types of ownership (number of firms)

	Bulgaria		Romania	
Type of firm	1997	1998	1997	1998
Maj. dom. priv.	897	1151	786	797
Maj. foreign	63	83	183	191
State	332	269	610	620

Table 4: Average PCMs by 2-digit industry

		Bulgaria		Romania	
Code	Name	β	Nr. Obs.	β	Nr. Obs.
	Manufacturing	0.21	1965	0.20	3424
15	Food and beverages	0.25	341	0.23	759
16	Tobacco	0.48	46	-	-
17	Textiles	0.25	230	0.15	392
18	Wearing apparel; fur	0.20	167	0.28	209
19	Leather, luggage and footwear	0.15	67	0.24	89
20	Wood, straw and plaiting materials	0.27	43	0.24	129
21	Pulp, paper and paper products	0.12	29	0.13	47
22	Publishing, printing and media	0.21	30	0.34	40
23	Coke, refined petroleum products and nuclear fuel	0.39	9	0.15	16
24	Chemicals and chemical products	0.28	107	0.15	149
25	Rubber and plastic products	0.27	44	0.22	115
26	Other non metallic mineral products	0.12	91	0.20	243
27	Basic metals	0.24	98	0.11	126
28	Fabricated metal products	0.20	119	0.20	244
29	Machinery and equipment n.e.c.	0.27	204	0.22	332
30	Office machinery and computers	0.22	5	0.28	13
31	Electrical machinery and apparatus n.e.c.	0.18	106	0.17	72
32	Radio, TV and communication equipment	0.13	32	0.12	22
33	Medical, precision and optical instruments	0.15	34	0.21	33
34	Motor vehicles, trailers and semi-trailers	0.22	34	0.15	84
35	Other transport equipment	0.49	20	0.18	56
36	Furniture, manufacturing n.e.c.	0.20	96	0.15	248

Note: all coefficient significant at 1%

Table 5: Effect of competition and ownership on market power in Bulgaria

Dep. var: Δy	(1)	(2)	(3)	(4)
Δx	0.20*** (0.003)	0.15*** (0.004)	0.13*** (0.004)	0.14*** (0.007)
$\Delta x * IMP$	-0.01 (0.009)	0.06*** (0.006)	0.11*** (0.008)	0.11*** (0.008)
$\Delta x * HERF$	-0.02 (0.015)	-0.04*** (0.011)	0.038*** (0.019)	0.04** (0.02)
$\Delta x * IMP * HERF$			-0.18*** (0.042)	-0.19*** (0.04)
$\Delta x * FOR$		0.07*** (0.006)	0.6*** (0.006)	0.06*** (0.006)
$\Delta x * PRIVDOM$		0.01*** (0.003)	0.01*** (0.003)	0.01*** (0.003)
IMP	-0.08 (0.23)	-0.12 (0.12)	-0.34** (0.16)	-0.33** (0.16)
$HERF$	-0.22 (0.40)	-0.07 (0.24)	-0.52 (0.41)	-0.51 (0.40)
$IMP * HERF$			1.44 (0.95)	1.40 (0.93)
FOR		-0.11 (0.12)	-0.11 (0.11)	-0.11 (0.11)
$PRIVDOM$		0.08 (0.07)	0.08 (0.06)	0.07 (0.06)
$\left(\frac{\Delta K_{it}}{K_{it}} + \frac{\Delta P_{Kit}}{P_{Kit}}\right)$				0.009 (0.005)
Year dummies	Y	Y	Y	Y
Nr. obs.	1522	1057	1057	1057

Note: standard errors in parentheses, ***/**/* denotes respectively significance at 1%/5%/10%

Table 6: Effect of competition and ownership on market power in Romania

Dep. var: Δy	(1)	(2)	(3)	(4)
Δx	0.15*** (0.0007)	0.14*** (0.001)	0.13*** (0.001)	0.22*** (0.009)
$\Delta x * IMP$	0.009*** (0.0006)	0.01*** (0.0007)	0.037*** (0.001)	0.029*** (0.001)
$\Delta x * HERF$	0.05*** (0.007)	0.12*** (0.008)	0.15*** (0.01)	0.13*** (0.01)
$\Delta x * IMP * HERF$			-0.19*** (0.01)	-0.16*** (0.009)
$\Delta x * FOR$		0.13*** (0.003)	0.13*** (0.003)	0.13*** (0.003)
$\Delta x * PRIVDOM$		0.06*** (0.001)	0.08*** (0.001)	0.06*** (0.001)
IMP	-0.015** (0.007)	-0.01 (0.01)	-0.03 (0.013)	-0.02 (0.013)
$HERF$	-0.09 (0.08)	0.04 (0.11)	-0.04 (0.13)	0.039 (0.129)
$IMP * HERF$			0.16 (0.15)	0.05 (0.14)
FOR		0.05 (0.04)	0.05 (0.04)	0.03 (0.04)
$PRIVDOM$		0.02 (0.02)	0.02 (0.02)	0.01 (0.02)
$\left(\frac{\Delta K_{it}}{K_{it}} + \frac{\Delta P_{Kit}}{P_{Kit}}\right)$				0.08*** (0.001)
Year dummies	Y	Y	Y	Y
Nr. obs.	3197	1917	1917	1917

Note: see table 4

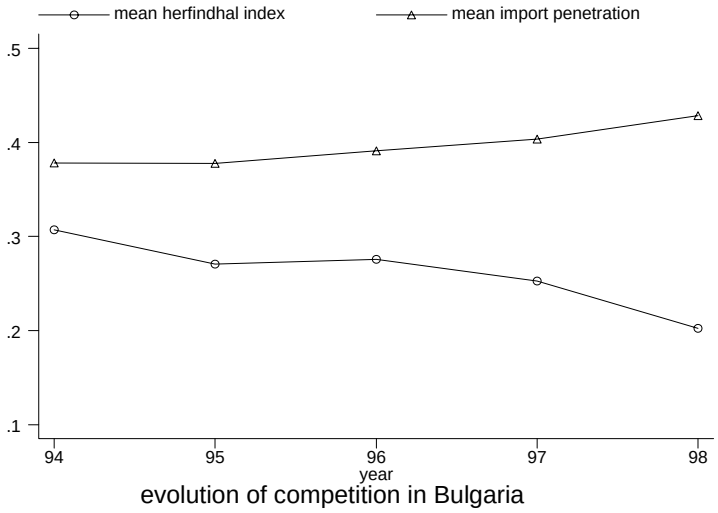

Figure 1: the evolution of import penetration and concentration in Bulgaria

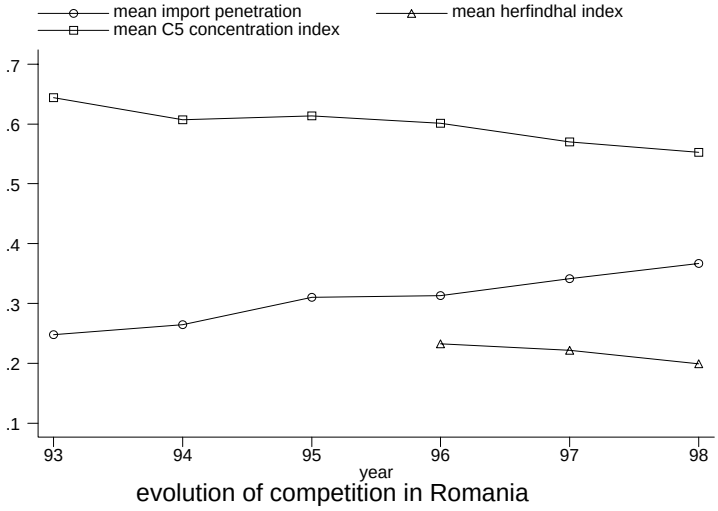

Figure 2: the evolution of import penetration and concentratio in Romania

Data appendix

Firm level variables were computed using data from the Amadeus CD-Rom:

PQ=operating revenue in thousands of local currency

$P_M M$=CM= costs of materials in thousands of local currency

$P_N N$=CE= cost of employees in thousands of local currency

K= net tangible fixed assets, including machinery, equipment, buildings, etc. evaluated at book value in thousands of local currency

P_{Kit} is the user cost of capital, defined as:

$$P_{Kit} = R_{it} = P_I \frac{r_{it} + \delta_{it}}{1 - t_{it}}$$

δ_{it} is the depreciation rate, r_{it} is the real interest rate and t_{it} is corporate taxation

P_I is the index of investment goods prices, at the country level and time varying

r is defined as interest paid over debt

δ is defined as depreciation over tangible fixed assets of the previous year

t is defined as profit tax over gross profits

$FOREIGN$=1 if a foreign investor owns more than 50% of the shares in the firm and equal to 0 otherwise

$PRIV$=1 if domestic investors own more than 50% of the shares in the firm and equal to 0 otherwise

Sector level information was provided by the respective National Statistical Offfices: the Herfindahl index ($HERF$) is the sum of squared market share in given 3-digit NACE Rev. 1 industry; the import share (IMP) is the ratio of imports over the sum of domestic sales and imports also in a given 3-digit NACE Rev. 1 industry.

Appendix B: Coverage of Amadeus

Table B1: Comparison between Amadeus and national statistics, 1998

	Bulgaria	Romania
Employment coverage	66%	70%
Sales coverage	82%	69%

Note: Employment coverage ratio= sum of employment of firms in Amadeus in 1998 divided by total sales in manufacturing as reported by the National Statistical Offices; idem for sales

Table B2: Id. by industry

Code	Name	Bulgaria	Romania
15	Food and beverages	51%	60%
16	Tobacco	80%	96%
17	Textiles	100%	87%
18	Wearing apparel; fur	44%	51%
19	Leather, luggage and footwear	57%	54%
20	Wood, straw and plaiting materials	51%	41%
21	Pulp, paper and paper products	76%	75%
22	Publishing, printing and media	55%	30%
23	Coke, refined petroleum products and nuclear fuel	-	100%
24	Chemicals and chemical products	98%	69%
25	Rubber and plastic products	55%	84%
26	Other non metallic mineral products	74%	79%
27	Basic metals	100%	45%
28	Fabricated metal products	56%	51%
29	Machinery and equipment n.e.c.	64%	76%
30	Office machinery and computers	23%	88%
31	Electrical machinery and apparatus n.e.c.	100%	63%
32	Radio, TV and communication equipment	100%	52%
33	Medical, precision and optical instruments	50%	67%
34	Motor vehicles, trailers and semi-trailers	67%	93%
35	Other transport equipment	87%	68%
36	Furniture, manufacturing n.e.c.	43%	61%
37	Recycling	-	75%

Note: see table C1; for Bulgaria data on industry sales for sectors 23 and 37 were not reported by the national statistical offices